



## TRANSPORTATION INDICATORS

### Introduction

#### I. Purpose of Transportation Indicators

The key outcomes of the CPPs transportation policies are to:

- Enhance Transportation and Land Use Linkages
- Increase the Availability of Modes other than Single Occupant Vehicles
- Reduce Commercial Traffic Congestion
- Protect and Improve the Transportation Infrastructure

The Transportation Indicators show changes over time in mobility-related phenomena as growth occurs, and the goals of the CPPs are realized. The goals include an increase in regional mobility and progress towards a multi-modal transportation system.

By reporting on parameters that are related to the linkage between transportation and land use development, and on the transportation choices made by King County residents, the Benchmark Report will help the Growth Management Planning Council (GMPC) evaluate regional progress toward the achievement of the Countywide Planning Policies' vision. The Benchmark Committee of the GMPC selected these Indicators as a first effort to report meaningful transportation data to the GMPC as it relates to the achievement of the Countywide Planning Policies.

#### II. Definition of Terms

- ***Mode** is the means of transportation, such as transit, walking, or bicycling.*
- ***Mode split** describes the number or proportion of people using each transportation mode.*
- ***Non-Motorized** types of transportation include walking and bicycling.*
- ***SOV** is a single occupant vehicle.*
- ***Transit ridership** refers to the number of passenger boardings on motorbus, trolleybus, streetcar, and DART services. These numbers do not include Vanpool, or para-transit ridership.*
- ***VMT** is vehicle miles traveled. See Environment Indicator #12 for more information.*
- ***Volume-to-Capacity Ratio (V/C)** is a level-of-service measure for roadways calculated by dividing the hour with the highest vehicle traffic volume by the carrying capacity of the road. Typically, a v/c ratio is calculated for the morning and afternoon commute.*
- ***Lane miles** refers to the total length of all lanes under consideration. **Centerline miles** refers to the number of miles along the "center line" of a road regardless of the number of lanes it contains.*
- *There are three basic operations that agencies undertake on their roads: **maintenance**, **rehabilitation**, and **reconstruction**. **Maintenance** refers to routine procedures such as crack sealing, patching, and pre-leveling (or skin patching) which needs to be done on all roadways every 2 - 6 years (see table below). **Rehabilitation** ordinarily involves repaving of a road segment. This needs to be done about every 12 years on arterials and approximately every 25 years on residential streets. **Reconstruction** refers to the major rebuilding of a roadway.*
- ***HOV** is a high occupancy vehicle such as a van or carpool.*

## TRANSPORTATION INDICATORS

*Outcome: Encourage linkages between residences, commercial centers and workplace locations*



**INDICATOR 41:** Average Commute Lengths for Major Destinations in King County.

Fig. 41.1

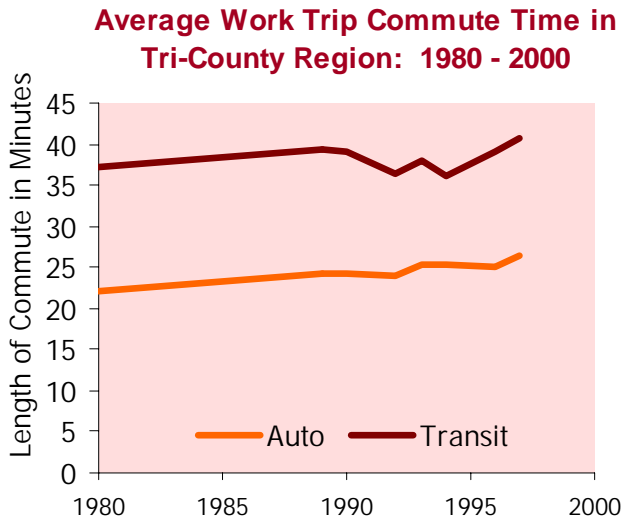
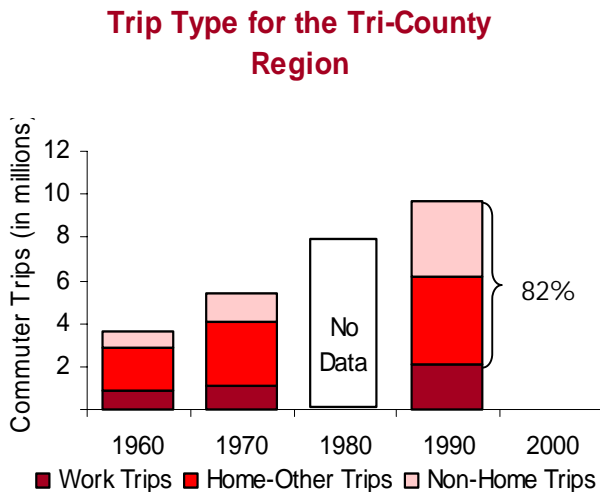


Fig.41.2



### About This Indicator

- Figure 41.1 shows a slight increase in average work trip commute length for the tri-county region since 1980.
- Commuters who choose to use public transit experienced commute lengths of forty minutes on average while auto drivers experienced average commutes of twenty-six minutes.
- Commute lengths have increased slowly over the past two decades despite continued increase in vehicle miles traveled. Factors moderating the increase in commute time include: flexible work hours, workers choosing to live closer to their jobs, and increased alternatives such as telecommuting.
- Figure 41.2 shows the growth in trips taken in the Puget Sound region. Work trips refer to trips taken from home to work and back. Home-other trips are trips to or from home to other destinations (e.g. gas station, mall, restaurant, etc.). Non-home trips are trips that do not originate or terminate at home. As can be seen, home-other trips and non-home trips make up over 82% of all trip types while trips to work make up about 18%. It appears that commuters are going more places after work or on the weekends. This contributes to traffic congestion.

**Data Source:** PSRC Puget Sound Trends, February 1999; PSRC Growth Management Planning Council Jobs-Housing Presentation, March 2000.

**Policy Rationale:** The policy rationale stems from Countywide Planning Policies: T-1 and T-4. This indicator measures accessibility. The proximity of households to employment means more travel options are available and fewer vehicle miles will be traveled.

## TRANSPORTATION INDICATORS

*Outcome: Increase the Availability of Modes Other than Single Occupancy Vehicles*



### INDICATOR 42: Metro Transit Ridership.

Fig. 42.21

Annual Passenger Boardings on Metro Transit					
1995	1996	1997	1998	1999	2000
81,657,696	88,334,963	88,926,696	94,256,548	97,127,919	100,810,279

Fig. 42.2

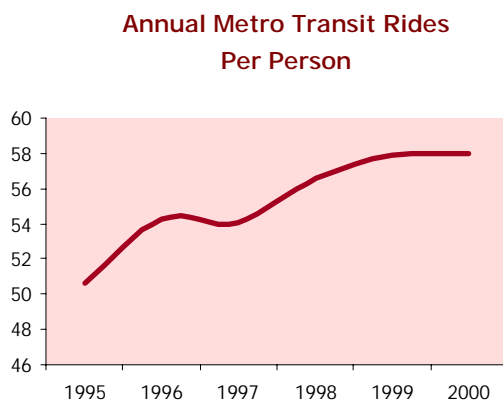
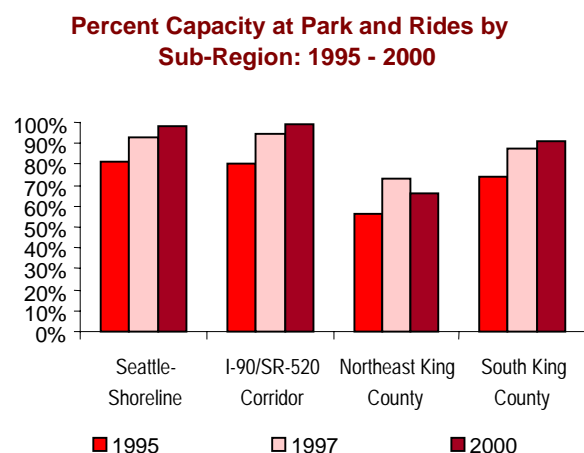


Fig. 42.3



### About this Indicator

#### *Transit Ridership*

- In 2000, transit ridership in King County surpassed 100 million rides given on motorbus, trolleybus, streetcar, DART, and Sound Transit.
- Transit ridership grew by 3.8%, or an additional 3.7 million boardings, in the year 2000. This data includes 2.3 million Sound Transit rides managed by King County Metro.

- Figure 42.2 shows that the per capita annual transit ridership has steadily risen since 1995. In 2000, the average King County resident rode the bus fifty-eight times a year.

#### *Park and Rides*

- In 2000, there were 17,399 parking spaces in 110 park and ride lots throughout King County of which, on average, 83% were utilized daily. Last year, 78% of park and ride spaces were used on average. This is up from 66% utilized in 1995.
- The capacity of King County park and ride lots decreased by 547 stalls since 1999 due to closure of underutilized leased park and ride lots and the temporary closure of the Overlake Park and Ride.
- Figure 42.3 tracks the percent of parking stalls utilized in major park and rides (300+ parking stalls) by Sub-County area. As can be seen from the graph, the Seattle-Shoreline, I-90/SR-520 Corridor and South King County park and rides are near full capacity. However park and rides in Northeast King County are underutilized with less than 70% of spaces occupied. This may be due to a number of factors such as frequency of bus service, length of travel time downtown compared to automobiles, and accessibility of facilities. Individual park and ride utilization percentages are shown in Figure 42.4.
- Some lots are above 100% capacity because commuters parked in non-designated stalls. This data also does not capture commuters who park on side streets and use park and ride facilities.



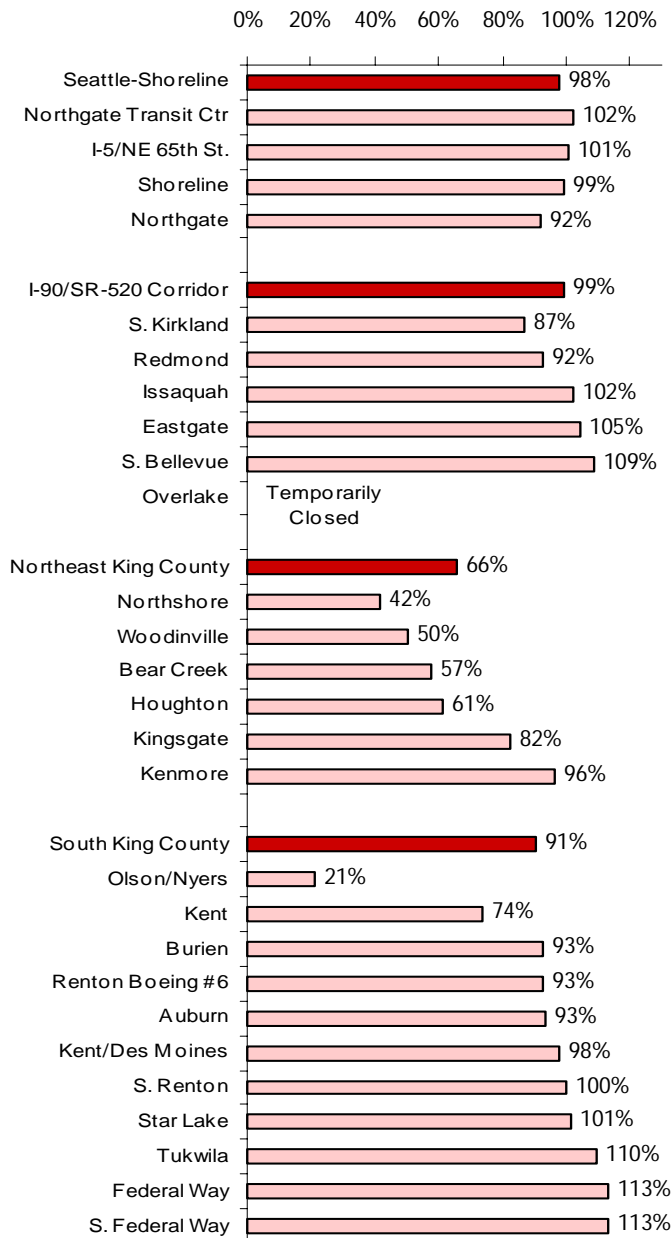
## TRANSPORTATION INDICATORS

### INDICATOR 42:

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Fig 42.4

#### Percent of Major Park and Ride Stalls Utilized in 2000



### For Comparison

- 79% of Snohomish County and 100% of Pierce County park and ride spaces were utilized in 1999.

### What We Are Doing

- Continuing to promote transit ridership in a variety of ways:
  - improving routes and service,
  - keeping fares affordable,
  - informing and advocating use of transit in public education campaigns
- Updating the Six-Year Transit Development Plan
- Creating 6,400 new park and ride spaces by 2004 including expansions involving:
  - 500 spaces at Northgate
  - 1,000 spaces at Eastgate
  - 700 spaces at Pacific Highway South
  - 500 spaces at the Issaquah Highlands park and ride

**Data Source:** Metro Transit General Manager's Quarterly Management Report, Metro Transit Division. King County Annual Growth Report

**Policy Rationale:** The policy rationale stems from Countywide Planning Policies: FW-18, T-1, T-5 and T-14. Transit demand management plays an important role in the development of key strategies for serving future growth. Transit use affects mode split, air quality, vehicle miles traveled, and traffic congestion. It is a significant part of a multi-modal system.

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### Outcome: Enhance Alternatives to Transportation Other Than Single Occupancy Vehicles



**INDICATOR 43:** Percent of Residents who Walk, Use Transit, Bicycles or Carpool as Alternatives to the Single Occupancy Vehicle.

Fig.43.1

Mode Split for all Daily Travel Trips				
	1990	1993	1996	1999
Transit /Ferry	3.6%	4.1%	3.8%	5.9%
HOV/Carpool	33.4%	34.3%	33.8%	35.3%
Non-Motorized/ Other	5.8%	7.3%	6.9%	6.9%
SOV	56.3%	53.6%	55.4%	51.9%

Fig.43.2

Mode Split for Work and Non-Work Trips in 1999		
	Work	Non-Work
Transit/Ferry	12.7%	3.4%
HOV/Carpool	13.9%	41.9%
Non-Motorized/ Other	5.0%	8.1%
SOV	68.4%	46.6%

#### About this Indicator

- Since 1990 there has been a modest upward trend in the use of other modes of transportation than single-occupancy vehicle.
- As a proportion of all daily trips, SOV use has declined 4.4 percentage points, while Transit and HOV/Carpool use have each increased about 2 percentage points. Non-motorized and other modes have also increased slightly.
- However, over half of all daily travel trips are still made in single occupancy vehicles. One-third of daily household travel is made by high occupancy or carpool vehicles.
- Figure 43.2 shows the mode split for work trips in King County. Transit is much more likely to be used for work trips than for non-work trips.
- While nearly 13% of work trips are by transit, and 14% are by HOV/carpool, over 68% are in single-occupancy vehicles. Bikes or walking accounts for 5% of work trips.
- Daily travel other than work trips is almost evenly split between SOV and HOV/carpool trips. Family members frequently accompany the driver on shopping, recreation, and other non-work trips.
- Non-motorized transport (biking, walking) is more common for non-work trips. Transit is the least used mode for non-work trips.

**Data Source:** PSRC Puget Sound Transportation Panel Survey; Texas Transportation Institute: 2001 Urban Mobility Report

**Policy Rationale:** The policy rationale stems from Countywide Planning Policies: FW-18, FW-19, T-1, T-7, T-8 and T-12. The CPPs encourage the development of an effective multi-modal transportation system that supports the use of modes other than the single occupancy vehicle.

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See Freight and Goods Transportation System Map - 1999 at:

<http://www.metrokc.gov/exec/orpp/benchmrk/bench01/freight01.pdf>

## TRANSPORTATION INDICATORS

### OUTCOME: Reduce Commercial Traffic Congestion

**INDICATOR 44:** Ability of goods and services to move efficiently and cost effectively through the region.



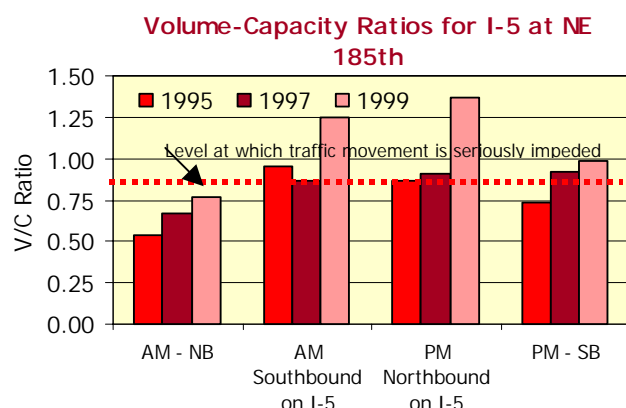
Fig. 44.1

Average Daily Traffic for I-5 at 185th Northbound					
	1993	1996	1999	2000	Percent Change '93 - '00
Trucks	3,080	3,452	4,029	4,500	46%
Cars, Vans, Pickups	79,796	79,489	87,531	90,000	13%
Total vehicles	82,876	82,941	91,560	94,500	14%
Trucks as % of Total	3.7%	4.2%	4.4%	4.8%	

Fig. 44.2

Average Daily Traffic SR 18 at Auburn, West Bound - 1993 - 1999				
	1993	1996	1999	Percent Change '93 - '99
Trucks	1,241	1,640	1,974	8.0%
Cars, Vans, Pickups	15,388	16,653	19,965	4.4%
Total vehicles	16,629	18,293	21,939	4.7%
Trucks as % of Total	7.5%	9.0%	9.0%	

Fig. 44.3



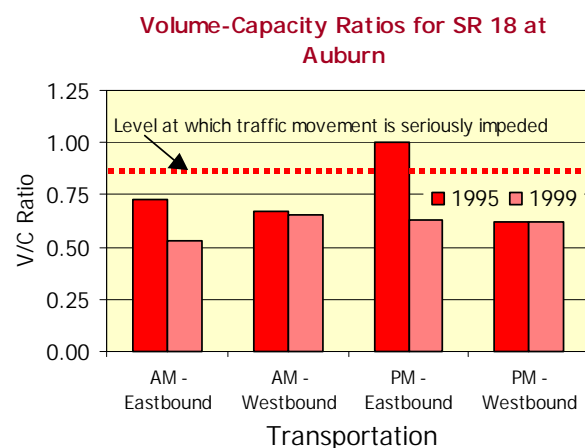
#### About this Indicator

- Figure 44.1 and 44.2 show that car rather than truck traffic is still the major source of congestion, especially on I-5. 95% of vehicles that pass along I-5 at N. 185<sup>th</sup> are cars, while 91% of the vehicles on SR 18 are cars.
- Freight trucks have increased as a share of total vehicles on the road since 1993. Truck traffic on I-5 at N. 185<sup>th</sup> has increased by 46% and cars by 13% in the past seven years. On SR 18, truck traffic increased by 8% while car traffic increased 4.4%.
- With both more cars and more trucks on the road, commercial traffic is less able to move efficiently throughout the region.
- Figs. 44.3 and 44.4 show the volume to capacity ratio for these two highways in 1995 and 1999. The key below describes traffic movement at higher V/C ratios.
- In 1999, with some capacity having been added, SR 18 was at acceptable levels. However, on I-5 traffic exceeded capacity in both the morning and the evening southbound, and in the evening northbound.

#### Key to Volume / Capacity Ratios

- .5 - .75 Travel speed still at or near free-flow, but ability to maneuver within the traffic stream is noticeably restricted.
- .75 - .9 Travel speeds begin to decline with increasing flows; minor incidents can be expected to cause queuing.
- .9 - 1.0 Operation at or near capacity and therefore volatile because there are virtually no useable gaps in the traffic stream; maneuverability is extremely limited.

Fig. 44.4





## TRANSPORTATION INDICATORS

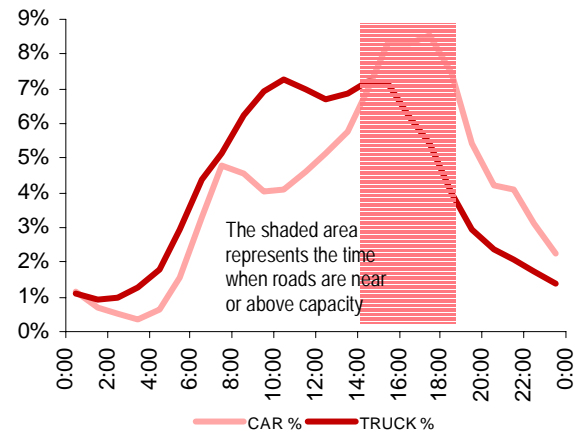
### INDICATOR 44:

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- Figure 44.5 shows the percent of daily trips taken by vehicle type during the course of the day. Congestion is near or above capacity (V/C ratio > .80) from around 2 pm to 6 pm. This corresponds with when cars are most frequently on the road.
- Truck traffic peaks between 9 am up to 2 pm when most people are at work. However after 2 pm, the number of truck drivers on the road decreases as they try to avoid commuting during the afternoon rush hour.

Fig. 44.5

#### Freight Truck vs. Car Travel Patterns Northbound and I-5 in 1999



### Outcome: Protect and Improve Transportation Infrastructure

**INDICATOR 45:** Number of lane miles of city, county and state roads and bridges in need of repair and preservation.

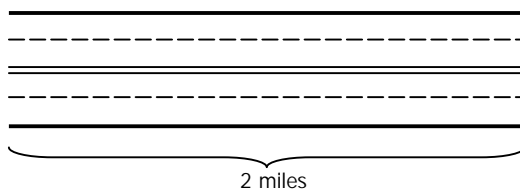


Fig. 45.1

Lane Miles in Need of Repair and Preservation	
Total Lane Miles Needing Repair in 1999	4,503
Percent of Total King County Lane Miles Needing Repair	30%
Total Dollars Budgeted for Road Repair and Preservation in 2000	\$3,917,000

Notes:

#### Centerline miles and Lane miles



2 miles = 2 centerline miles  
2 centerline miles x 4 lanes = 8 lane miles

- Lane miles** refers to the total length of all lanes under consideration. **Centerline miles** refers to the number of miles along the "center line" of a road regardless of the number of lanes it contains. It is used to estimate the total amount of roadway in a jurisdiction. Thus a four-lane road of

two "centerline" miles would amount to eight lane miles. Repair and construction costs are generally estimated in lane miles. An average for most cities would be approximately 2.3 lane miles per centerline mile.

- There are three basic operations that agencies undertake on their roads: **maintenance**, **rehabilitation**, and **reconstruction**. Maintenance refers to routine procedures such as crack sealing, patching, and pre-leveling (or skin patching) which needs to be done on all roadways every 2 - 6 years (see Fig. 45.3 below).
- Rehabilitation ordinarily involves repaving of a road segment. This needs to be done about every 12 years on asphalt arterials and approximately every 25 years on asphalt residential streets. Reconstruction refers to the major rebuilding of a roadway, and is not considered in these tables.

(continued on p. 92)





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Fig. 45.2

The data in the following table is not intended to provide an accurate comparison among cities. Roads budgets differ dramatically from one city to another for a number of reasons: 1) Some include more personnel and overhead costs than others; 2) the condition of roads vary greatly, depending on the age, size, and location of the city; and 3) the definition of "repair and preservation" costs are different. On the average, routine maintenance of roads is likely to range between \$3,500 and \$5,500 per lane mile, while major preservation / rehabilitation efforts can cost anywhere from \$8,000 to \$42,000 per lane mile. (See Fig. 45.3) However, a city that is budgeting less than \$3,000 per year per lane mile may be deferring essential maintenance.

Amount Budgeted for Road Repair and Preservation by Jurisdiction: 2000				
	Total Lane Miles 2000	Total Roads Budget in 2000	Amount Spent or Budgeted for Repair or Preservation of Roads in 2000	Amount Per Lane Mile Budgeted for Repair /Preservation
Algona	NA	NA	NA	NA
Auburn	385.0	\$ 1,646,000	\$ 92,000	\$ 239
Beaux Arts	3.0	\$ 14,359	\$ -	\$ -
Bellevue	846.0	NA	NA	NA
Black Diamond	52.1	\$ 138,902	\$ 35,421	\$ 680
Bothell	600.0	\$ 5,326,298	\$ 1,376,351	\$ 2,294
Burien	247.0	\$ 4,448,900	NA	NA
Carnation	19.8	\$ 492,000	\$ 40,000	\$ 2,020
Clyde Hill	34.1	\$ 185,000	\$ 184,596	\$ 5,407
Covington	64.0	\$ 720,000	\$ 337,096	\$ 5,267
Des Moines	104.9	\$ 6,547,000	\$ 1,415,000	\$ 13,489
Duvall	60.0	\$ 809,188	\$ 245,074	\$ 4,085
Enumclaw	55.0	\$ 187,068	\$ 68,898	\$ 1,253
Federal Way	462.9	\$ 8,516,000	\$ 4,383,000	\$ 9,469
Hunts Point	4.9	\$ 32,373	\$ 32,373	\$ 6,661
Issaquah	129.5	\$ 730,000	\$ 195,980	\$ 1,513
Kenmore	107.8	\$ 2,474,509	\$ 1,076,887	\$ 9,990
Kent	518.0	\$ 7,900,000	\$ 1,150,000	\$ 2,220
Kirkland	307.3	\$ 3,448,969	\$ 400,000	\$ 1,302
Lake Forest Park	42.9	\$ 350,000	\$ 278,617	\$ 6,489
Maple Valley	93.5	\$ 267,987	\$ 300,181	\$ 3,210
Medina	32.0	\$ 1,423,000	\$ 898,000	\$ 28,063
Mercer Island	105.9	\$ 1,970,000	\$ 1,970,000	\$ 18,602
Milton	27.5	\$ 590,175	\$ 270,000	\$ 9,818
Newcastle	71.0	\$ 4,390,000	\$ 220,000	\$ 3,099
Normandy Park	53.4	\$ 87,636	\$ 83,088	\$ 1,556
North Bend	NA	NA	NA	NA
Pacific	19.0	\$ 408,830	NA	NA
Redmond	285.0	\$ 10,274,825	\$ 378,557	\$ 1,328
Renton	454.0	\$ 11,806,296	\$ 6,886,553	\$ 15,169
Sammamish	281.2	\$ 3,000,000	\$ 1,160,000	\$ 4,125
SeaTac	131.5	\$ 14,427,506	\$ 243,164	\$ 1,849
Seattle	4230.0	NA	\$ 9,500,000	\$ 2,246
Shoreline	369.3	\$ 2,522,852	\$ 1,093,711	\$ 2,962
Skykomish	3.3	\$ 21,750	\$ 10,184	\$ 3,086
Snoqualmie	43.4	\$ 614,856	\$ 614,856	\$ 14,157
Tukwila	200.0	\$ 24,136,000	\$ 3,027,679	\$ 15,138
Woodinville	94.9	\$ 1,985,168	\$ 1,201,015	\$ 12,656
Unincorp. King Cty	4192.7	NA	NA	NA
Yarrow Point	8.0	\$ -	\$ -	\$ -



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### INDICATOR 45:

(continued from page 90)

4. As used in Fig. 45.2, the terms **"repair"** and **"preservation"** are loosely defined. In most cases they refer to the number of lane miles in need of maintenance, minor repair, or rehabilitation **in the near future (one to two-years)**. Because they have not yet been precisely defined, there may be considerable variation in the number of lane miles each city considers in need of "repair" or "preservation". The numbers above and in the background table should be taken as broad estimates.
5. Roads are generally divided into **arterials, collectors, and residential streets**. They may be further classified as urban or rural. Generally, arterials (because they carry the most traffic) will need maintenance and rehabilitation more often than residential streets.
6. There are three types of paved roadways: **asphalt, bituminous-treated (BST), and Portland Cement Concrete**. BST is generally not used on arterial or collector pavements. Other than in Seattle, there will be very few, if any, Portland Cement Concrete pavements. Asphalt is most common.
7. The State of Washington undertakes road repair and maintenance on state roads in King County, as well as many projects such as bridge repair and painting, which cannot be measured in lane miles. None of these are included in the table.

Fig. 45.3

Approximate Cost of Repair and Preservation of Roads ( in 1997)			
	Routine Maintenance	Rehab: Asphalt	Rehab: BST
Lane Mile Cost - Arterial	\$5,280	\$42,000	\$14,600
Lane Mile Cost- Residential	\$3,227	\$32,300	\$8,067
Average Expected Life - Arterial	2 - 4	12	8
Average Expected Life - Residential	4 - 6	27	10

### About This Indicator

- Based on reports by 26 out of 40 jurisdictions in King County, at least 4,500 lane miles of roads in King County will require maintenance, rehabilitation, or reconstruction in the next few years.
- It is difficult to estimate the actual cost of road repair per lane mile since there are so many variables to consider. However, Fig. 45.3 gives some approximate costs per lane mile (for 1997) depending on whether the segment is an arterial or residential street. For instance, rehabilitating (repaving) an asphalt arterial would have cost approximately \$42,000 per lane mile in 1997. The costs are for the in-place materials and labor and do not reflect any improvements or overhead.
- A more precise definition of "lane miles in need of repair", and a better estimate of the associated costs, are needed to achieve more consistent numbers from the jurisdictions and their projected annual road budgets.

**Data Source:** Benchmark Data Collection from Cities; King County Transportation Planning, Washington State Department of Transportation. Derald Christensen, Measurement Research Corporation, Gig Harbor, WA.

**Policy Rationale:** The policy rationale stems from Countywide Planning Policies FW-20 through FW-23 and T-8. This Indicator attempts to measure our ability to protect and preserve our existing infrastructure, and to eliminate, lessen, or defer the need to invest in new facilities.